

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1 Claim 1 (currently amended): A An antenna apparatus for
- 2 use with a digital communications channel over which a
- 3 multi-bit digital control signal is communicated, said
- 4 antenna apparatus supporting a plurality of antenna pattern
- 5 positions, different ones of said antenna pattern positions
- 6 being identified by different predetermined position
- 7 indicator values, the antenna apparatus comprising:
- 8       a digital communications channel for receiving a
- 9       digital control signal including antenna pattern position
- 10 control information;
- 11       control circuitry, coupled to the digital
- 12 communications channel, the control circuitry including a
- 13 direction control device for receiving said multi-bit
- 14 digital control signal, said digital control signal
- 15 including one of said predetermined position indicator
- 16 values and at least one other control value, and for
- 17 generating at least one antenna pattern position control
- 18 signal from said digital control signal and one additional
- 19 control signal; and
- 20       a controllable antenna element assembly having a
- 21 steerable antenna pattern including a plurality of lobes
- 22 and at least one null regions including at least a first
- 23 region having a first gain and a second region having a
- 24 second gain which is lower than said first gain, the
- 25 controllable antenna element assembly being responsive to
- 26 said at least one antenna pattern position control signal.
- 1 Claim 2 (original): The apparatus of claim 1, wherein said
- 2 digital communications channel is a serial bus.

1 Claim 3 (currently amended): The apparatus of claim 1,  
2 wherein

3 An antenna apparatus for use with a digital  
4 communications channel over which a multi-bit digital  
5 control signal is communicated, said antenna apparatus  
6 supporting a plurality of antenna pattern positions,  
7 different ones of said antenna pattern positions being  
8 identified by different position indicator values, the  
9 antenna apparatus comprising:

10 control circuitry, coupled to the digital  
11 communications channel, the control circuitry including a  
12 direction control device for receiving said multi-bit  
13 digital control signal, said digital control signal  
14 including one of said predetermined position indicator  
15 values and at least one other control value, and for  
16 generating at least one antenna pattern position control  
17 signal from said digital control signal; and

18 a controllable antenna element assembly having a  
19 steerable antenna pattern including a plurality of regions  
20 including at least a first region having a first gain and a  
21 second region having a second gain which is lower than said  
22 first gain, the controllable antenna element assembly being  
23 responsive to said at least one antenna pattern position  
24 control signal, said controllable antenna element  
25 outputting a received signal onto said communications  
26 channel; and

27 wherein said communications channel is implemented  
28 using a coaxial cable over which both the received signal  
29 and said multi-bit digital control signal are communicated  
30 also used to output signals received by said controllable  
31 antenna element assembly.

1 Claim 4 (currently amended): The apparatus of claim 1, An  
2 antenna apparatus for use with a digital communications  
3 channel over which a digital control signal including  
4 antenna pattern position control information is  
5 communicated, the apparatus comprising:

6 control circuitry, coupled to the digital  
7 communications channel, the control circuitry including a  
8 direction control device for generating at least one  
9 antenna pattern position control signal from said digital  
10 control signal; and

11 a controllable antenna element assembly having a  
12 steerable antenna pattern including a plurality of regions  
13 having different gains, the controllable antenna element  
14 assembly being responsive to said at least one antenna  
15 pattern position control signal;

16 wherein said digital control signal includes an  
17 antenna position portion and a gain control portion, and  
18 wherein the control circuitry includes a gain  
19 decoder for generating a gain control signal as a function  
20 of the gain control portion of said control signal.

1 Claim 5 (original): The apparatus of claim 4,  
2 wherein said digital control signal further  
3 includes a channel number portion, and  
4 wherein the control circuitry further includes  
5 channel number processing circuitry for generating a tuning  
6 voltage as a function of the channel number portion of said  
7 digital control signal.

1 Claim 6 (original): The apparatus of claim 5, further  
2 comprising a tuning circuit coupled to said antenna element

3 assembly, the tuning circuit being responsive to the tuning  
4 voltage.

1 Claim 7 (original): The apparatus of claim 4,  
2 wherein said digital control signal further  
3 includes a polarization control portion, and  
4 wherein the control circuitry further includes a  
5 polarization control circuit coupled to said antenna  
6 element assembly.

1 Claim 8 (original): The apparatus of claim 6, further  
2 comprising:  
3 a memory device including antenna capabilities  
4 information.

1 Claim 9 (original): The apparatus of claim 8, wherein said  
2 controllable antenna element assembly includes:  
3 a plurality of individual antenna elements; and  
4 at least one switch being coupled to each of the  
5 individual antenna elements, each switch being coupled  
6 to said direction control device.

1 Claim 10 (original): The apparatus of claim 8, wherein  
2 said control circuitry includes at least one integrated  
3 circuit for performing a decoding operation on at least a  
4 portion of said digital control signal.

1 Claim 11 (original): The antenna apparatus of claim 10,  
2 further comprising a coupling device including at least  
3 three connections, the first connection for coupling said  
4 digital communication channel to a control line of a  
5 receiver, the second connection for coupling said

6 controllable antenna element assembly to a signal input of  
7 said receiver, and a third connection for coupling the  
8 control circuitry to a power supply line of said receiver.

1 Claim 12 (currently amended): A receiver apparatus,  
2 comprising:

3 a tuner for receiving a broadcast signal from an  
4 antenna device;  
5 a received broadcast signal processing circuit  
6 and for generating at least one signal measurement value  
7 from said received broadcast signal;

8 an antenna controller for generating a digital  
9 antenna control signal including at least one of gain  
10 information, polarization control information, and channel  
11 number information, in addition to antenna pattern position  
12 control information, the antenna pattern position control  
13 information being determined by said antenna controller as  
14 a function of said at least one signal measurement value;  
15 and

16 a communications channel for outputting the  
17 digital antenna control signal to said antenna device.

1 Claim 13 (original): The apparatus of claim 12, wherein  
2 said received broadcast signal processing circuit is a  
3 demodulator and wherein said at least one signal  
4 measurement value is a signal to noise estimate.

1 Claim 14 (original): The apparatus of claim 12, wherein  
2 said communications channel is a serial data bus.

1 Claim 15 (original): The apparatus of claim 14, wherein  
2 said antenna controller includes:

3 an antenna control and positioning routine used  
4 to generate said digital antenna control signal.

1 Claim 16 (original): The apparatus of claim 15, wherein  
2 said antenna control and position routine includes  
3 instructions for rotating said antenna pattern through a  
4 plurality of positions to select an optimum position based  
5 on said at least one measurement value without human input.

1 Claim 17 (original): The apparatus of claim 15, further  
2 comprising:

3 stored antenna information received from an  
4 antenna device via said serial data bus.

1 Claim 18 (original): The apparatus of claim 17, further  
2 comprising:

3 stored antenna channel state information  
4 specifying settings to be used for a plurality of  
5 controllable antenna features for each of a plurality of  
6 receiver channel settings.

1 Claim 19 (original): The apparatus of claim 14, further  
2 comprising:

3 a multi-terminal adapter for connecting said  
4 apparatus to an antenna device, the multi-terminal adapter  
5 including a first terminal for receiving said broadcast  
6 signal from the antenna device, a second terminal for  
7 supplying power to said antenna device; and a third  
8 terminal for coupling said serial bus to the antenna  
9 device.

1 Claim 20 (original): The apparatus of claim 14, wherein  
2 the received broadcast signal processing circuit is a  
3 television signal demodulator circuit.

1 Claim 21 (currently amended): A receiver apparatus,  
2 comprising:

3               a tuner for receiving a broadcast signal from an  
4 antenna device;

5               a received broadcast signal processing circuit  
6 and for generating at least one signal measurement value  
7 from said received broadcast signal;

8               an antenna controller coupled to said broadcast  
9 signal processing circuit for generating digital antenna  
10 control signals used to automatically adjust the position  
11 of an antenna pattern of said antenna device, the antenna  
12 pattern including a plurality of lobes and at least one  
13 null so that the null is orientated in the direction of a  
14 source of signal interference; and

15               a communications channel for outputting the  
16 digital antenna control signals to said antenna device.

1 Claim 22 (original): The receiver apparatus of claim 21,  
2 wherein said antenna controller further comprises:

3               means for including antenna gain control  
4 information in at least some of said digital antenna  
5 control signals.

1 Claim 23 (original): The receiver apparatus of claim 22,  
2 wherein said antenna controller further comprises:

3               means for including channel information in at  
4 least some of said digital antenna control signals.

1 Claim 24 (original): The receiver apparatus of claim 22,  
2 wherein said antenna controller further comprises:  
3                   means for including antenna polarization  
4 information in at least some of said digital antenna  
5 control signals.

1 Claim 25 (original): A television, comprising:  
2                   an antenna device having an electronically  
3 steerable antenna pattern, the antenna pattern including at  
4 least a front lobe, a rear lobe and at least one null, the  
5 antenna device including:  
6                   a control circuit for controlling the  
7 position of said antenna pattern in response to  
8 digital control signals;  
9                   a receiver coupled to said antenna device, the  
10 receiver including;  
11                   a demodulator for demodulating  
12 broadcast signals received from said antenna  
13 device and for generating at least one signal  
14 measurement value; and  
15                   antenna control circuitry for  
16 generating a plurality of said digital control  
17 signals to steer said antenna pattern as a  
18 function of said at least one signal measurement  
19 value; and  
20                   a display device coupled to said demodulator for  
21 displaying images generated from said received broadcast  
22 signals.

1 Claim 26 (original): The television of claim 21, further  
2 comprising:

3 a television housing for housing both said  
4 antenna device and said receiver.

1 Claim 27 (original): The television of claim 21, further  
2 comprising:

3 a serial data bus for coupling the antenna  
4 control circuitry to the antenna device.

1 Claim 28 (original): The television of claim 27, wherein  
2 said antenna control circuitry includes means for  
3 determining when said antenna pattern position is in a  
4 position which produces less signal interference than at  
5 least one other antenna pattern position.

1 Claim 29 (currently amended): A multi-bit antenna control  
2 signal used for controlling characteristics of an antenna,  
3 the control signal comprising:

4 a first plurality of signal components  
5 ~~representing at least two~~ including one of: a direction  
6 field including antenna pattern direction control  
7 information, a gain field including antenna gain  
8 information, a channel number field including a channel  
9 number, and a polarization field including antenna  
10 polarization information; and

11 a second signal component, said second signal  
12 component including a field which is different from the  
13 field included in said first signal component, said second  
14 signal component including one of: a direction field  
15 including antenna pattern direction control information, a  
16 gain field including antenna gain information, a channel  
17 number field including a channel number, and a polarization  
18 field including antenna polarization information.

1 Claim 30 (currently amended): The multi-bit antenna  
2 control signal of claim 29, wherein said first plurality of  
3 signal component components includes said direction field,  
4 the direction field including at least three bits.

1 Claim 31 (original): The multi-bit antenna control signal  
2 of claim 30, wherein the direction field specifies an  
3 antenna pattern direction.

1 Claim 32 (currently amended): The multi-bit antenna  
2 control signal of claim 30, wherein said plurality second  
3 of signal components further includes said gain field, the  
4 gain field including at least two bits used to indicate a  
5 level of gain to be applied by an amplifier device in said  
6 antenna.

1 Claim 33 (currently amended): The multi-bit antenna  
2 control signal of claim 30, wherein said first plurality of  
3 signal component components further includes said channel  
4 number field, the channel number field including at least  
5 three bits used to indicate the number of a broadcast  
6 channel to be received by said antenna.

1 Claim 34 (currently amended): The multi-bit antenna  
2 control signal of claim 30, wherein said plurality of  
3 signal components further first signal component includes  
4 said polarization field, the polarization field including  
5 at least one bit used to specify one of a plurality of  
6 possible antenna polarizations.

1 Claim 35 (original): A method of controlling an antenna,  
2 the method comprising the steps of:  
3 generating at least one digital control signal  
4 including a direction information field and at least one of  
5 a gain information field, channel number field, and  
6 polarization information field; and  
7 transmitting said digital control signal to an  
8 antenna.

1 Claim 36 (original): The method of claim 35, wherein the  
2 step of generating a digital control signal includes:  
3 measuring a signal characteristic of a broadcast  
4 signal received by said antenna.

1 Claim 37 (original): The method of claim 36, wherein the  
2 step of generating at least one digital control signal  
3 includes:  
4 measuring the signal to noise ratio of said  
5 received broadcast signal; and  
6 wherein the method further comprises  
7 automatically sending said antenna multiple digital control  
8 signals to modify the direction of the antenna pattern of  
9 said antenna in an attempt to find a position which results  
10 in a satisfactory signal to noise ratio.

1 Claim 38 (original): The method of claim 36, further  
2 comprising the step of:  
3 receiving antenna capability information from  
4 said antenna.

1 Claim 39 (original): The method of claim 38, wherein the  
2 step of transmitting said digital control signal to an

3 antenna includes the step of transmitting said digital  
4 control signal over a serial bus.

1 Claim 40 (original): The method of claim 39, further  
2 comprising the step of:

3 supplying direct current power to said antenna  
4 over a line which is separate from said serial bus.

1 Claim 41 (original): The method of claim 40, wherein said  
2 step of measuring a signal characteristic of a broadcast  
3 signal received by said antenna includes:

4 receiving from said antenna the received  
5 broadcast signal via a co-axial cable.

Claims 42-53 (Canceled)

1 Claim 54 (new): An apparatus, comprising:

2 an antenna device having an electronically  
3 steerable antenna pattern, the antenna pattern including at  
4 least first region and a second region, the first region  
5 having a higher gain than the second region, the antenna  
6 device including:

7 a control circuit for controlling the  
8 position of said antenna pattern in response to a  
9 digital control signal;

10 a receiver coupled to said antenna device, the  
11 receiver including:

12 a demodulator for demodulating  
13 broadcast signals received from said antenna  
14 device and for generating at least one signal  
15 measurement value; and

16 antenna control circuitry for  
17 generating a plurality of said digital control  
18 signals to steer said antenna pattern as a  
19 function of said at least one signal measurement  
20 value; and  
21 a display device coupled to said demodulator for  
22 displaying images generated from said received broadcast  
23 signals.

1 Claim 55 (new): The apparatus of claim 54, further  
2 comprising:  
3 a housing for housing both said antenna device  
4 and said receiver; and  
5 wherein the gain in said first region is at least  
6 6 dB higher than the gain in said second region.

1 Claim 56 (new): The apparatus of claim 54, wherein said  
2 digital control signals are multi-bit signals, the  
3 apparatus further comprising:  
4                   a serial data bus for carrying said multi-bit  
5 digital control signals, said serial data bus coupling the  
6 antenna control circuitry to the antenna device.

1 Claim 57 (new): The apparatus of claim 54, wherein said  
2 antenna control circuitry includes means for determining  
3 when said antenna pattern position is in a position which  
4 produces less signal interference than at least one other  
5 antenna pattern position.

1 Claim 58 (new): The apparatus of claim 54, wherein said  
2 digital control signal includes at least two different  
3 control information fields, the two different control

4 information fields being from the group of information  
5 fields consisting of: a direction field including antenna  
6 pattern direction control information, a gain field  
7 including antenna gain information, a channel number field  
8 including a channel number, and a polarization field  
9 including antenna polarization information.

1 Claim 59 (new): An antenna apparatus for use with a  
2 digital communications channel over which a digital control  
3 signal including antenna pattern position control  
4 information is communicated, the apparatus comprising:

5 control circuitry, coupled to the digital  
6 communications channel, the control circuitry including a  
7 direction control device for generating at least one  
8 antenna pattern position control signal from said digital  
9 control signal; and

10 a controllable antenna element assembly having a  
11 steerable antenna pattern including a plurality of regions  
12 having different gains, the controllable antenna element  
13 assembly being responsive to said at least one antenna  
14 pattern position control signal;

15 wherein said digital control signal includes an  
16 antenna position portion and a channel number portion, and

17 wherein the control circuitry includes channel  
18 number processing circuitry for generating a tuning control  
19 signal as a function of the channel number portion of said  
20 digital control signal.

1 Claim 60 (new): The apparatus of claim 59,  
2 wherein said apparatus further comprises a tuning  
3 circuit coupled to said antenna element assembly, the  
4 tuning circuit being responsive to the tuning voltage.

1 Claim 61 (new): An apparatus for use with an antenna  
2 device having an electronically steerable antenna pattern,  
3 said antenna apparatus supporting a plurality of antenna  
4 pattern positions, the apparatus comprising:

5 a receiver having an input for coupling to said  
6 antenna device, the receiver including:

7 a demodulator for demodulating broadcast signals  
8 received from said antenna device and for generating at  
9 least one signal measurement value; and

10 antenna control circuitry for generating a plurality  
11 of multi-bit digital control signals to steer said antenna  
12 pattern as a function of said at least one signal  
13 measurement value, each multi-bit digital control signal  
14 including a predetermined position indicator value  
15 indicating one of said plurality of antenna pattern  
16 positions to which said antenna device is to be steered and  
17 a second value used to provide additional antenna device  
18 control information.

1 Claim 62 (new): The apparatus of claim 61, wherein said  
2 second value is a polarization control value.

1 Claim 63 (new): The apparatus of claim 61, wherein said  
2 second value is a channel number value.

1 Claim 64 (new): The apparatus of claim 61, wherein said  
2 second value is a gain value.

1 Claim 65 (new): The apparatus of claim 1, wherein said  
2 other control value is a polarization control value.

1 Claim 66 (new): The apparatus of claim 1, wherein said  
2 other control value is a channel number value.

1 Claim 67 (new): The apparatus of claim 1, wherein said  
2 other control value is a channel number value.

1 Claim 68 (new): An antenna apparatus for use with a  
2 digital communications channel over which a digital control  
3 signal including antenna pattern position control  
4 information is communicated, the apparatus comprising:

5 control circuitry, coupled to the digital  
6 communications channel, the control circuitry including a  
7 direction control device for generating at least one  
8 antenna pattern position control signal from said digital  
9 control signal; and

10 a controllable antenna element assembly having a  
11 steerable antenna pattern including a plurality of regions  
12 having different gains, the controllable antenna element  
13 assembly being responsive to said at least one antenna  
14 pattern position control signal;

15 wherein said digital control signal includes an  
16 antenna position control portion and a polarization control  
17 portion, and

18 wherein the control circuitry includes a  
19 polarization decoder for generating a polarization control  
20 signal as a function of the polarization control portion of  
21 said control signal.